The Distance

Where the gap between wanting and happening lives, and the arithmetic of closing it

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Abstract

Most of what people want depends on someone else doing their part. The gap between wanting something and it happening can be measured, and most of it sits in the handoffs between people.

Across the six-layer behaviour atlas in the companion paper, The Atlas, one pattern held in every income, place and occupation: much of what a person wants to move depends on someone else answering, delivering, approving or showing up.

The mathematics of that dependence is unforgiving. A result that needs k people to each do their part succeeds with probability p^k, so the distance grows with every handoff. Most of it is not refusal. It is the forgotten follow-up, the unanswered message, the agreement nobody can prove.

The paper sets out the laws behind the distance, what they require of anything that carries work between people, and the smallest unit of value that follows from them. The derivations are in the appendices, for anyone who wants to check them.

Part I — The distance

The distance between what a person wants and what actually happens can be measured.

Five people with very different lives show the same structure. The rows are illustrative, not survey findings.

Person	Wants to move	Depends on	Where it stalls
Smallholder, Bihar	Sell the paddy at a fair price before the rains	Mandi agent, transporter, buyer	The truck was "confirmed" by voice; nothing proves it
Textile trader, Surat	Get paid for last month's dispatches	30 retailers, a transporter, an accountant	Each retailer says "next week"; nobody tracks all 30
Mother, Bengaluru	Keep a parent's care and the children's school on track	Doctor, pharmacy, school, driver, siblings	Who is taking Papa to the follow-up on Thursday?
Student, Delhi	Get a recommendation letter before a deadline	Professor, department office	Asked twice, no reply, deadline in nine days
Doctor, Chennai	Know that referred patients actually got their tests	Labs, patients, other doctors	The referral leaves; nothing comes back

Defining the distance

For any intention, the distance is the chance it does not become reality:

$$D = 1 - \Pr(\text{happens} \mid \text{wanted})$$

An intention passes through stages: recognised, intended, attempted, dependent on others, completed, verified. The probability of arriving is the product of the stage rates, so a leak anywhere lengthens the whole distance.

What fills the distance

The obstacles people describe fall into three kinds, and Kitaab can only move some of them. That boundary is the honest scope of the product.

Obstacle	Kind	Can Kitaab move it?	How
Forgotten follow-ups	Carrying	Yes, directly	It keeps the matter and comes back at the right time
Coordination across people	Carrying	Yes, directly	It reaches each person and binds their answers to one record
Incomplete execution	Carrying	Yes, directly	It tracks each step to an honest end state
Distrust	Carrying	Partly	It keeps a record of what was said and done
Fragmented information	Knowing	Yes	Answers over the person's own records, with sources
Uncertainty, lack of knowledge	Knowing	Partly	Cited research; it never invents an answer
Bureaucracy	Having	Partly	It can carry the steps, not change the rules
Limited resources	Having	No	It never holds money and creates no resources

Kitaab's lever is Carrying first and Knowing second. It does not touch Having, by design. How much of the distance sits in Carrying is an open empirical question, and a field study will measure it.

Part II — The laws of the distance

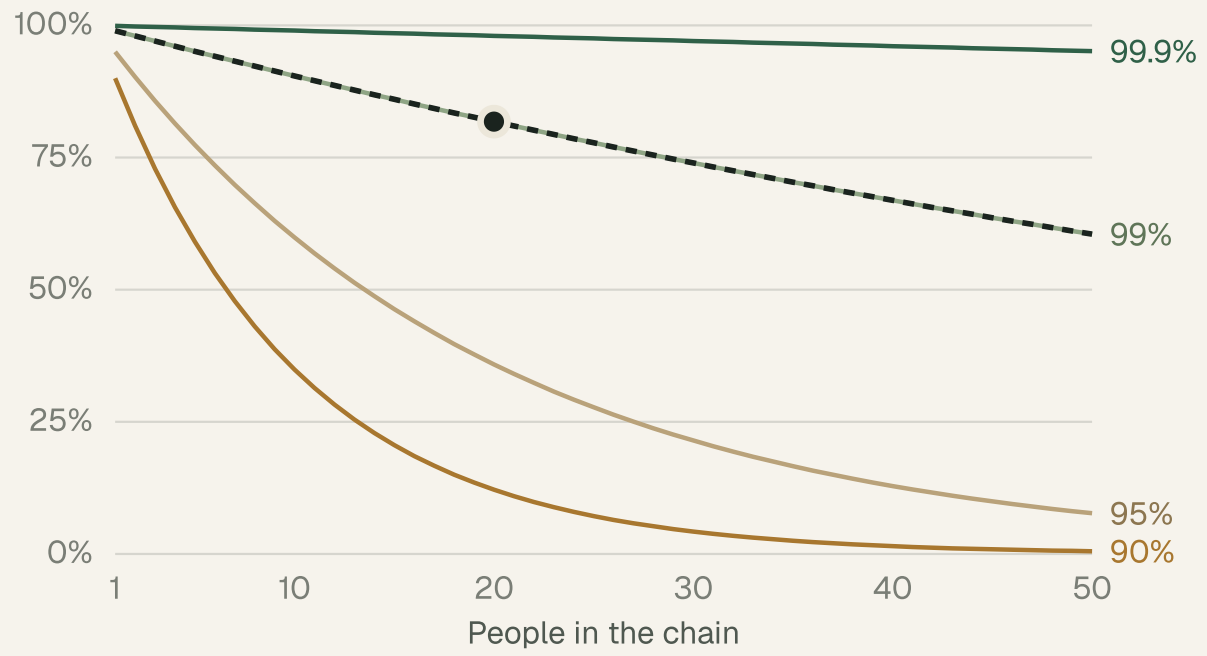
Eight results, each a theorem or exact arithmetic, explain why the distance exists and what anything that closes it has to do. Notation is in Appendix A and derivations in Appendix B.

The central law: chains decay exponentially

If a result needs k parties, and each does their part with probability p, the result happens with probability:

$$S = p^k$$

At p = 0.99, a 10-party chain succeeds 90% of the time and a 20-party chain 82%. Removing ten handoffs does as much as halving every person's failure rate, and it is far cheaper.



Each line is one level of reliability per person. Computed from $S = p^k$; no measured data.

The curves are pure arithmetic. Even very reliable people lose a meaningful share of long chains, which is why shortening chains and catching slips matter more than asking people to try harder.

The eight laws and what each demands

Law	Formula	What it says, in numbers	Design rule it forces
1. Chain	$S = p^k$	20 parties at 99% each succeed only 82% of the time	Shorten chains: one carrier holds every leg
2. Carrying (Little's Law)	$L = \lambda \times W$	30 new matters a week, 2 weeks each to close: 60 open in one head	Close faster; the open count falls with closing time
3. Overload	$L = \rho \div (1 - \rho)$	At 90% busy, 9 items wait; at 95%, 19	The busiest people drop the most; serve them first
4. Retry	$1 - (1 - p)^t$ per step, for t tries	13 steps at 90%: 25% succeed with no follow-up, nearly all with it, for 11% more effort	Follow-up is the core feature, not a courtesy
5. Silence (FLP, 1985)	No time limit means no certain agreement	You cannot tell a slow person from a gone one	Every matter carries a deadline and an honest "no reply" state
6. Record (Lamport, Shostak, Pease, 1982)	Without proof, $n \geq 3f + 1$	Three people, one lying, no record: unresolvable	Keep a record; with signed records, agreement survives any number of liars
7. Hub	$n(n - 1) \div 2$ versus $n - 1$	200 people: 19,900 pairwise links or 199 through one hub	Be the hub that holds the shared state
8. Leakiest step	Gain $\leq 1 \div p_i$	Perfecting a 65% step can lift results 1.54×; an 80% step only 1.25×	Measure every stage before acting

What the laws say together

Coordination fails through long chains, overload, silence, missing records and too many links. The cures are equally few: a single carrier, faster closing, follow-up, deadlines, records and a hub.

Part III — The Ask That Comes Back

The smallest unit of value that follows from the laws: you say one thing that depends on someone else, and the answer comes back to you, with a record, without you chasing.

The unit

One sentence. One other person. One answer. One record. Everything larger, from a supplier negotiation to a wedding, is many of these units running together.

1. **Said.** You speak or type once, in any language. A photo or forwarded message works too.
2. **Kept.** Kitaab keeps the matter, with who it involves and when it matters.
3. **Reached.** Kitaab asks the other person in their own language, whether or not they use Kitaab.
4. **Answered.** They reply in their own words: any language, a voice note, even a thumbs-up. Kitaab attaches it to the right matter.
5. **Came back.** The answer returns to you, at the right moment, with what was said and when.
6. **Closed.** Every matter ends in an honest state: done, declined, cancelled, or no reply by the deadline.

The same unit, in five lives

Person	What they say	What comes back
Smallholder, Bihar	"Transporter se poocho truck kal subah aayega ya nahi" (ask the transporter if the truck comes tomorrow morning)	His voice note: yes, 7 am, with the time he said it
Textile trader, Surat	Ask the 30 retailers who owe me when they will pay	Thirty answers in one place, and the four who went silent
Mother, Bengaluru	Check with my brother whether he can take Papa to the doctor Thursday	"Can't Thursday, can do Friday", in time to rearrange
Student, Delhi	Ask my professor if the letter will be ready by the 28th	The reply, or a polite second ask on day four
Doctor, Chennai	Confirm the lab got my patient's sample	The lab's confirmation, attached to the patient's record

Appendix A — Notation

Every symbol in this paper and what it means. A symbol keeps one meaning throughout.

Symbol	Meaning
p	Chance one party does their part on one try
k	Number of parties who must all do their part
$S = p^k$	Chance the whole chain succeeds
D	The distance: the chance a wanted thing does not happen
Pr(A | B)	Probability of A given B
L	Average number of matters open at once
λ	New matters arriving per unit of time
W	Average time to close one matter
ρ	Load: arrivals divided by capacity; 0.9 means 90% busy
t	Number of tries allowed at a step
p_i	Success rate of step i in a chain
n	Number of people in a group
f	Number of faulty or lying parties in a group
≥, ≤, ≈	At least, at most, approximately

Appendix B — Derivations and proofs

Each result used in the paper, with its assumptions stated and its arithmetic shown. Tags: [Exact] is mathematics; [Assumption] is a modelling choice; [Theorem] is a published proof.

B1. The chain law [Exact, given independence]

If parties succeed independently, the probability that all k succeed is the product of their probabilities. With equal p, that product is p^k. Correlated failures (a strike, a flood, a network outage)

break independence: normal days then look better than p^k and shock days far worse.

B2. Little's Law [Theorem: Little, 1961]

For any stable system in steady state, average items present = arrival rate × average time in the system: $L = \lambda \times W$. It needs no assumption about the distributions of arrivals or service. Example: 30 matters a week × 2 weeks = 60 open.

B3. The overload curve [Assumption: random arrivals, one server]

For a single server with random (Poisson) arrivals and exponentially distributed service times, the mean number in the system is $\rho \div (1 - \rho)$. At $\rho = 0.8$, 0.9, 0.95 and 0.99 this gives 4, 9, 19 and 99. Real people prioritise and abandon, so the shape holds and the exact counts do not.

B4. The retry law [Exact, given independent tries]

With independent tries, the chance a step succeeds within t tries is $1 - (1 - p)^t$, and the expected number of tries is $1 \div p$ (a geometric distribution).

- Thirteen steps at $p = 0.9$ with one try each: $0.9^{13} \approx 0.254$.
- With retries until success: expected tries $13 \div 0.9 \approx 14.4$, about 11% more effort, and completion approaches certainty if deadlines allow.

B5. The leakiest step [Exact]

For $S = p_1 \times p_2 \times \ldots \times p_k$, raising p_i to 1 multiplies S by $1 \div p_i$. A 65% step can lift S by up to 1.54 times; an 80% step by up to 1.25 times. This holds only in the multiplied model. In a bottleneck model, S is set by the tightest capacity, and in a dependent-steps model, improving one stage can lower the next.

B6. Agreement under liars [Theorem: Lamport, Shostak and Pease, 1982]

With only unsigned ("oral") messages and synchronous communication, agreement among n parties is possible only if $n \geq 3f + 1$, where f is the number of faulty parties. With unforgeable signed messages, agreement is possible for any number of faulty parties. Three people, one lying and no record, is the impossible case.

B7. Silence [Theorem: Fischer, Lynch and Paterson, 1985]

In a fully asynchronous system, with no bound on message delay, no deterministic protocol can guarantee agreement if even one party may stop responding. Practical systems escape by adding time limits. For Kitaab, every matter therefore carries a deadline and a named "no reply" outcome.

References

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